

Sir William Anson, Parliamentary Secretary of the Board of Education, took the chair at the afternoon meeting of the first day. He confessed that, having been educated in the dark ages, when science and mathematics found but a small place—or perhaps he should more strictly say when mathematics had but a small place and science had no place at all—in the curriculum of the public schools, he came to listen with a perfectly unprejudiced mind to the discussion. After all, a comparison of various methods of teaching seemed to him to be for practical purposes as valuable as anything that could be done in the way of the training of the teacher. A grain of practice was worth a much larger proportion of theory, and it must be of great value to hear men who had been successfully engaged in teaching explain the difficulties of their subjects and the modes in which they brought their minds to bear upon the minds of those who had to be taught. The great secret of teaching was to bring their minds into immediate contact with the mind of the learner and to impart to him what they knew and the processes by which they learned it.

In the morning, papers were read by Mr. Usherwood, on the experimental method in geometry, and by Mr. Frank Castle, on the teaching of workshop mathematics. Mr. Usherwood related his experiences of teaching geometry to boys beginning the subject on a practical inductive plan, and advocated the use of paper-folding and similar expedients as means of encouraging the pupil's self-activity. Mr. Castle enumerated some of the shortcomings of the education given in the great public schools, and traced them to the rigid, iron-bound nature of the prevailing system. He referred to recent changes in the syllabuses of many public examinations as a hopeful sign that methods of mathematical instruction were becoming less academic and more suited to the practical needs of the present day. The subsequent discussion, in which the Rev. T. W. Sharpe, Dr. Hoffert, Mr. C. W. Bourne and others took part, showed that the work which has been accomplished by the committees of the British Association and of the Mathematical Association, in the direction of rationalising mathematical instruction, is, on the whole, meeting with the approval of practical teachers.

At the afternoon meeting, addresses on the teaching of geometry were delivered by Messrs. S. O. Andrews, W. D. Eggar and A. W. Siddons. Mr. Eggar said that the first object in the choice of exercises for a young boy beginning the study of geometry was to instil notions of lines, points, angles, areas, volumes and similar subjects, and this was best accomplished by simple measurement. A discussion followed during which Mr. Gerrans, referring to the recent changes in the mathematical requirements for university examinations, said that the universities had in the past deferred such alterations because of their doubt as to whether the schools were ready for change.

Rational Instruction in Botany.

The third meeting, under the presidency of Prof. Farmer, F.R.S., was devoted to a consideration of the methods of botanical teaching. During the course of his remarks, Prof. Farmer said that, examination syllabuses notwithstanding, the best way was to study a small part of the subject thoroughly and in all their instruction to help their students to think. Too little attention, he thought, was given to the economic aspects of the subject. He advocated a careful examination of the reasons, for example, of the peculiar conditions of the distribution of vegetation under beech and pine trees, and pointed out that such problems would lead to the discovery of the effects exerted by light, soil and other influences on growth. The effect of grass in an apple orchard was also instanced, and the information which could be obtained from the study of this problem in leading to an appreciation of the interaction of the grass growth in the matter of drainage and the supply of oxygen was pointed out. Prof. Farmer gave an interesting example of what he called a "museum of mismanagement," in the case of a larch plantation which had been planted on a mountain-side, though it should have been well known that the larch is a deep-rooted plant.

Two papers were read, one by Miss Lilian Clarke, on the rational teaching of botany, and the other by Mr. Lacey, on experimental plant physiology. Miss Clarke, in a preeminently practical paper, described how, by experiments in the laboratory and school-garden at James Allen's school, Dulwich, she has succeeded in making botany an interesting and educational subject of study for girls. She explained that though in the

past this work has been somewhat in abeyance in the winter, they hoped in the future to be able, owing to the provision by the London Technical Education Board of a botanical laboratory, to be able to pursue the work without a break throughout the year. Mr. Lacey concerned himself more with the work of advanced students. He described numerous experiments, illustrated by an excellent series of lantern slides, to show how lessons in botany may be made more valuable by the utilisation of the common objects of ordinary life in the experimental work. The slides of botanical objects under the microscope which he also showed were of particular value to teachers in demonstrating how easy it is to supply the student with graphic illustrations of the objects of his study. The informative nature of the papers led to questions from the audience rather than a discussion.

The Art of Illustrating Teaching.

The last meeting, at which Prof. Callendar, F.R.S., presided, was taken up with a consideration of the methods of illustrating lectures by experiments and lantern slides. In introducing the speakers, Prof. Callendar insisted on the importance of experimental work in the teaching of physics and chemistry, and referred to the difference between experiments suitable for performance by the student and those necessary to illustrate the lectures of the teachers. Two addresses were given, one by Mr. G. S. Newth, on experimental illustration in the teaching of chemistry, and the other by Mr. Harold Busbridge, on the making of lantern slides. Mr. Newth, before proceeding to perform certain typical experiments, criticised in some particulars what is commonly known as the heuristic method of teaching, and complained that in important respects it misled the pupil and gave him wrong ideas as to the nature of the great generalisations called chemical laws. In the selection of experiments, he said, the teacher should choose those only which are really illuminative and never introduce one merely because it is amusing. Mr. Newth also gave invaluable hints to teachers as to how to avoid failure in their experiments. The experiments performed were well chosen and invariably met with the success which Mr. Newth's well-known manipulative dexterity led the audience to expect.

Mr. Busbridge provided teachers with practical assistance in the art of making lantern slides at a small cost. He left on one side all photographic methods and confined his attention to the elucidation of simple expedients which could be utilised by a teacher with very little experience of laboratory methods. In a short discussion which followed, Dr. Hoffert referred to an important consideration if the experimental illustration of the ordinary teacher of science in schools is to be improved, that is, the diminution of his duties if time enough is to be provided for him to prepare good, suitable lecture experiments. As Dr. Hoffert said, it is unreasonable to expect the science master to add to his already arduous work by staying after school hours to prepare experiments. All science masters should be given time enough during the hours in which the school is open in which to prepare the experiments necessary for satisfactory lessons in science. A. T. S.

UNIVERSITY AND EDUCATIONAL INTELLIGENCE.

It is reported that the Italian Minister of Public Instruction has authorised the establishment of a post-graduate school of hygiene and medical jurisprudence in connection with the University of Turin.

At University College, London, Mr. V. H. Blackman will give a course of about six demonstrative lectures on microscopical technique in botany on Mondays during the current term, commencing Monday, January 19, at 4 p.m.

THE *Daily Mail* states that the late Mr. F. J. Quick, of Eltham, and Trinity Hall, Cambridge, left his residuary estate to the University of Cambridge in trust, to apply the income in promoting the study of vegetable and animal biology, for which purpose the university will probably eventually receive between 50,000*l.* and 60,000*l.*

At a meeting last week of the Liverpool School of Tropical Medicine, it was announced that since the previous meeting 10,000*l.* had been collected or promised towards founding a chair of tropical medicine in University College, Liverpool, which had been accepted by the college authorities. Major

Ross has been elected to the chair, and his title will be the Sir Alfred Jones professor of tropical medicine. Dr. J. W. W. Stephens has been elected to the Walter Myers lectureship in tropical medicine.

At the last meeting of the Lancaster Town Council, we learn from the *Lancaster Observer*, a letter was read from Prof. Percy Frankland, F.R.S., addressed to the principal of the Storey Institute, in which he announces his intention of giving to the Institute a sum of one hundred pounds to be devoted to the purposes of a "Frankland Prize" for chemistry, whereby the memory of his late father, Sir Edward Frankland, may be perpetuated in Lancaster, in which town he received his education and spent the early years of his life.

A NEW Technical College, the building of which has been completed at a cost of about 50,000*l.*, was opened at Wigan on Monday. Mr. R. B. Haldane, K.C., M.P., delivered an address, in which he said they had, through the enterprise of a few public-spirited people, established an institution which would take its place in that great organic structure of the national education which was slowly being built up. Referring to the question whether charters should be given to establish teaching universities in Manchester and Liverpool, Mr. Haldane said he was quite sure that, if not in a few weeks, at least in a few years, they would see those great centres of academic learning in full force, with full distinction of university power and stature.

In November last, Prof. Schmidt accompanied the German Emperor to England, and went to Oxford to investigate the details of the Rhodes scholarships. He has just reported the results of his conference with the Oxford authorities to the Kaiser. The Berlin correspondent of the *Daily Mail* reports that in an interview Prof. Schmidt remarked:—"The German Government unreservedly acknowledges the great value of the Rhodes scholarships, and will do its utmost to assist German students to avail themselves of them. You may state that the prospects of our accepting the scholarships are altogether favourable. There are no fundamental difficulties whatever in the way. Nothing but the difference between German and English university requirements suggests possible obstacles, the preparatory education of German students being so far in advance."

At the annual dinner of the Bristol University College Colston Society on Tuesday, Sir J. Crichton Browne, who was the principal guest, alluded to the subject of local universities. He said objections to universities were futile in consideration of the educational needs of the hour. What was wanted was not a lot of provincial universities, but a group of national English universities, which should collectively meet the higher educational wants of the country as a whole. Each university should have instructive features of its own, each adapted to its environment, but all supplying the best instructions, the highest culture and the finest discipline of the day. If Liverpool obtained the charter it sought, they would inevitably have modern universities in Manchester, Leeds, Durham, and Cardiff; and Bristol should not be content to be left out in the cold. It seemed inevitable that there would be a great extension of the university system in England; and there was no need to be afraid of going too far for some time to come, especially when one in 520 went now to Scotch universities, whereas only one in 5000 went to universities in England.

The development of higher education in the United States continues rapidly. The registrar of Columbia University, Mr. Rudolf Tombo, contributes to a recent number of *Science* certain interesting university registration statistics which reveal that the opening of each new academic year shows a marked advance over the last. The statistics are those of the beginning of November of last year, and deal with eighteen of the leading American universities. For the session preceding that with which the statistics deal, the relative rank of the seventeen leading universities on the basis of total enrolment was as follows:—Harvard, Columbia, Michigan, Chicago, California, Minnesota, Cornell, Wisconsin, Yale, Pennsylvania, Northwestern, Indiana, Nebraska, Missouri, Princeton, Leland Stanford and Johns Hopkins. If the students attending courses for teachers are counted, the total number for Harvard is 5468 and that for Columbia 5352. Chicago has had a considerable increase of students, and in Mr. Tombo's table ranks third, with 4296. Syracuse, which is included in the table for

the first time, has a larger enrolment than Indiana. The teaching staff at Harvard numbers 533, at Columbia 504; and at the Johns Hopkins University, where the total number of students is only 669, there are 147 teachers of different grades. Indiana seems to have the smallest staff, viz. 65 teachers for 1648 students.

THE Senate of the University of London has adopted a scheme for the inspection of schools and for a school-leaving examination in connection with which school-leaving certificates will be awarded. The purpose of the scheme is to secure that the new certificate shall admit the holder as a matriculated student of the University without further examination at the age of sixteen years, and that schools shall have freedom in the selection of the subjects of study pursued by their pupils. For pupils only able to attain the necessary standard in some, but not all, of the subjects required for the school-leaving certificate, their attainments will be set out on a school record. Opportunity will be afforded to the more capable pupils of obtaining credit for advanced work. As the course of study pursued by a pupil at school, his age, the period during which he has attended school, the subjects in which he has reached the standard required by the University, and also any form of manual, artistic or technical skill will be set out on the record, it should become a valuable testimonial to the pupil on entering life. In order to maintain the same standard for the matriculation examination and the school-leaving examination, the University proposes to appoint a small board of inspectors, consisting of persons of distinction and large teaching experience, who will act as moderators for the matriculation examination and be responsible for maintaining the standard of the school-leaving certificate.

SOCIETIES AND ACADEMIES.

LONDON.

Royal Society, November 20, 1902.—"On the Correlation of the Mental and Physical Characters in Man." Part ii. By Alice Lee, D.Sc., Marie A. Lewenz, B.A., and Karl Pearson, F.R.S.

In a second paper on this subject read before the Royal Society, the following conclusions were reached:—

In order to meet an objection raised at the discussion on the first paper, the correlations were found, for the Cambridge graduates, between

- (1) Intelligence and the ratio $\frac{\text{length of head}}{\text{stature}}$,
- (2) Intelligence and the ratio $\frac{\text{breadth of head}}{\text{stature}}$;

both of these results came out even smaller than the correlations of intelligence and absolute head measurements.

The correlation between auricular height and intelligence in school-boys was found to be insensible. The statement made by MM. Vachide and Pelletier in the *Comptes rendus* that there is a correlation in this case appears to be based on meagre material and defective method.

The correlations between intelligence and (1) strength of pull, (2) strength of squeeze, (3) long sight are all negative, that is, the honours men have less strength and shorter sight than the pass men, but here again all these values are less than the probable errors, and consequently no weight can really be attached to them individually.

The correlation between intelligence and weight is slightly larger than the probable error.

The correlations of intelligence with

- (1) The ratio $\frac{\text{weight}}{\text{stature}}$,
- (2) The ratio $\frac{\text{weight}}{(\text{stature})^2}$,
- (3) The ratio $\frac{\text{weight}}{(\text{stature})^3}$

were found indirectly by formulæ, and (1) was also found directly; here again the results are of the same insignificant character as when absolute weights are taken.

Summing up the results of the calculations based on the Cambridge measurements, we come to the conclusion that the